

REMARKS

By this amendment, applicants have amended claims 5 and 16 to more clearly define their invention and have amended Figures 13 - 16 as suggested by the Examiner.

In view of the foregoing amendments to claim 16, reconsideration and withdrawal of the objection to claim 16 at the bottom of page 2 of the office action are requested.

Claims 5 - 9, 15 and 17 stand rejected under 35 USC 102(b) as allegedly being anticipated by United States Patent No. 5,080,130 to Terwilliger et al. Claims 10, 11 and 16 stand rejected under 35 USC 103(a) as being unpatentable over Terwilliger et al. Applicants traverse these rejections and request reconsideration thereof.

The present invention relates to a compressor including a compression chamber for compressing working fluid therein, a discharge port through which the working fluid flows out from the compression chamber, and a valve for opening or closing the discharge port. According to one aspect of the present invention, as shown by way of example only in Figure 4, the valve has a valve seat portion 18 provided around the discharge port and having tapered surfaces so that a cross-sectional area of the discharge port increases in a direction away from the compression chamber 21. A valve 17 having a projection portion with a tapered surface is provided so that, in a closed position, at least a portion of the tapered surface is in contact with the tapered surface of the valve seat portion 18. The valve 17 has a flat surface portion provided at an end portion of the valve 17 on the side of the compression chamber 21. A retainer 20 positions the valve 17 on the valve seat portion 18. As set forth in independent claim 5 and as shown by way of example

only in Figure 4, a bore 6a is provided in the end plate 6b which blocks an opening of the cylinder 4 (see figure 1). The retainer 20 is inserted into the bore 6a for holding the valve 17 opposed to the valve seat portion 18.

The Terwilliger et al patent discloses a compressor of the reciprocal type, in which a discharge valve 18 having port seats 19, each being in a tapered shape, is disposed between the cylinder head 14 and the discharge porting plate 16, and wherein that discharge valve 18 is biased by a coiled spring 22, so as to be engaged with the valve seat 24, so that the discharge valve is restricted in its movement in the radial direction by a function of the stud 20 but is freely slidable within a restricted region in the axial direction. With such a structure, the discharge valve 18 is engaged into a recess on the discharge porting plate 16, thereby removing or eliminating the volume of a gap defined between them.

Thus, in the structure shown in this reference, sealing is achieved between the spaces in the front and the rear of the discharge portion of the discharge valve; i.e., between the compression chamber 28 and the compressed gas discharge chamber 26, by contacting the port seats 19 of the discharge valve 18 with the valve seat 24 of the discharge porting plate 16. However, for example, in a case in which the discharge valve is assembled in an eccentric manner, or if an inclination or offsetting is brought about by a hydraulic force acting upon the discharge valve, the discharge valve is inclined, so that it cannot obtain sufficient surface contact with the valve seat. Therefore, the sealing function is lost, and working fluid of high-temperature and high-pressure can run in the reverse direction, i.e., from the compressed gas discharge chamber 26 into the compression chamber 28, thereby bringing about a drawback that the efficiency is lowered.

Also, with a compressor of large capacity as is disclosed in the reference, since the parts of the discharge valve are relatively large and the numbers of products manufactured relatively small, the problem of assembling the discharge valve eccentrically mentioned above can be controlled. However, in the case of relatively small-sized compressors, e.g., of the type used in household refrigerators and room air-conditioners, for example, since they are produced in large numbers through mass production, the structure disclosed in Terwilliger et al cannot be applied, since it causes the assembling procedure to be complex; therefore, it is difficult to apply such a structure from a viewpoint of productivity.

The present invention overcomes the problems noted above and provides a compressor which can be easily and accurately assembled and can have improved compression efficiency. According to the present invention, the end plate that blocks the opening of the cylinder includes a discharge portion provided therethrough, a valve seat portion provided around the discharge port and a bore connected to the valve seat portion. A retainer is inserted into the bore for holding a valve opposed to the valve seat portion. Despite the allegations made by the Examiner in the outstanding office action, the Terwilliger et al patent does not disclose such a structure. While the Examiner refers to elements 16 and 14 in Terwilliger et al as an end plate, only element 16 of Terwilliger is a discharge porting plate. The discharge porting plate 16 is sandwiched and gasketed between the cylinder block 10 and the cylinder head 14. Clearly, element 14 is cylinder head made as a separate part from the porting plate 16 and then assembled therewith with a gasket therebetween. Cylinder head 14 includes a stud 20 on which the discharge valve 18 is axially slidable. However, contrary to the allegation made by the Examiner, the plate 16

does not include a bore connected to the seat 24. Accordingly, the Terwilliger et al patent does not disclose the presently claimed invention.

Moreover, since the Terwilliger et al patent does not describe any possible problems associated with misalignment of the discharge valve 18 and the seat 24, there would have been no motivation for modifying the arrangement of Terwilliger et al to arrive at the presently claimed invention.

For the foregoing reasons, the presently claimed invention is patentable over Terwilliger et al.

Applicants note the Examiner has cited the King patent as being relevant to applicants' disclosure. However, since this patent was not applied in rejecting claims formerly in the application, further discussion of this patent is deemed unnecessary.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all of the claims now in the application are requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 520.40206X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

A handwritten signature in dark ink, appearing to read 'Alan E. Schiavelli', is written over a horizontal line.

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Attachments



FIG. 13

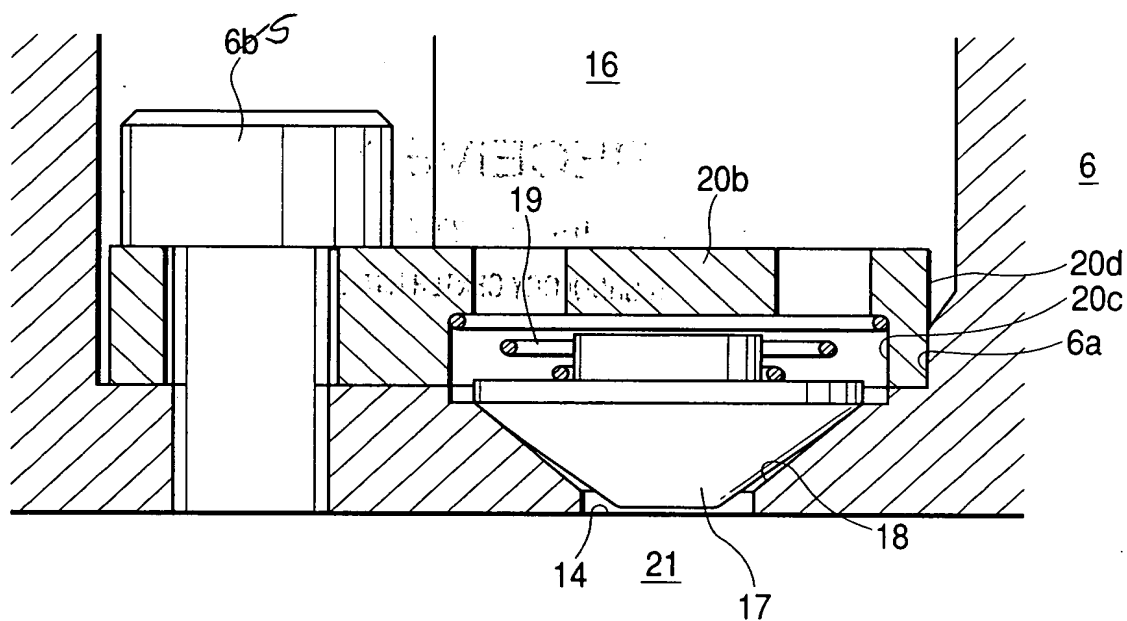


FIG. 14

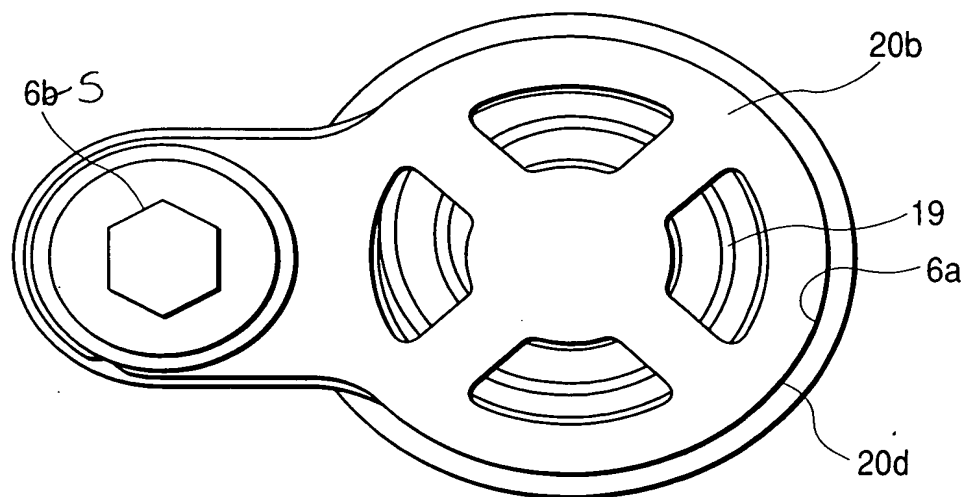


FIG. 15

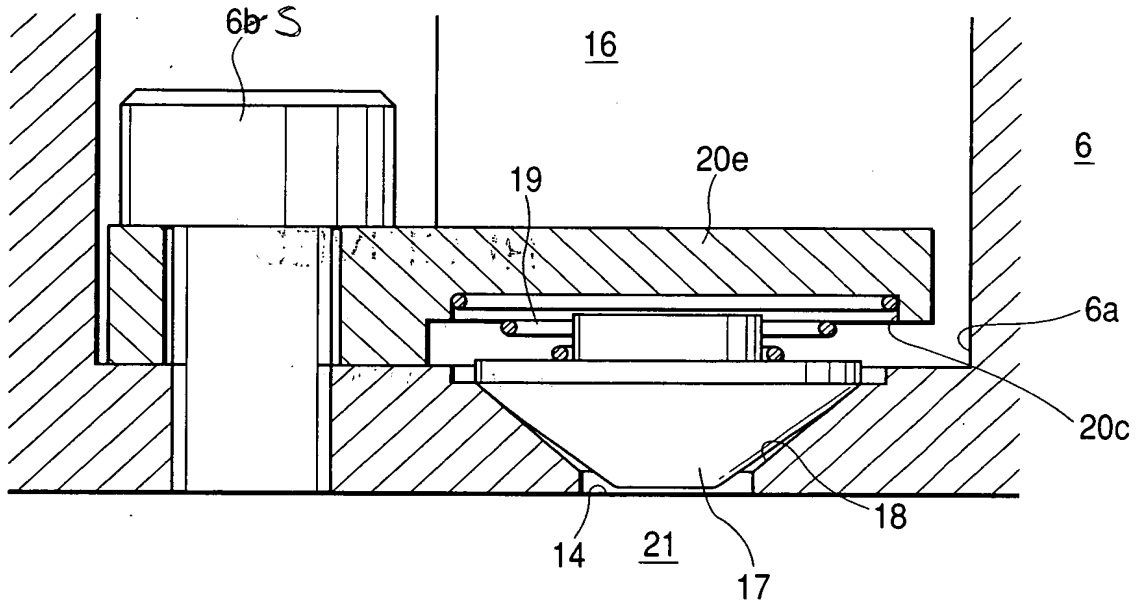


FIG. 16

